A Report Prepared for

Van Waters & Rogers Inc.
6100 Carillon Point
Kirkland, Washington 98033

QUARTERLY PROGRESS REPORT
APRIL-JUNE 1993
BOISE, IDAHO

HLA Project No. 22947 03

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EXECUTIVE SUMMARY

This progress report presents data collected and summarizes activities performed in association with ongoing investigations in Boise, Idaho, from March 29 through June 25, 1993. Activities to be conducted during the next reporting period are also presented.

Activities conducted under the Water Supply Order during the reporting period include:

- Submitting the Affected Area Hookup letter
- Resubmitting letter to homeowners who have not responded to VW&R's offer to hook up residences to the Boise Water Corporation Water System.
- Contracting with Boise Water Corporation (BWC) to install water meters
- Contracting with licensed plumbing contractors to connect households to the BWC water system
- Conducting quarterly sampling.

Work planned for the next reporting period includes:

- Resampling wells with perc concentrations above the analytical detection limit but below 5 micrograms per liter
- Continuing water line connections and reimbursement for 1 year of BWC utility costs.

Activities conducted under the PSA Order during the reporting period include:

- Submitting a draft Soil Boring Sampling and Analysis Plan (SAP)
- Submitting a letter responding to Department comments on the SAP.

Activities to be conducted under the PSA Order during the next reporting period include installation of wells in accordance with the soil boring SAP.

Work conducted under the Mall Order during the reporting period included:

- Conducting the Pilot Boring program

- Conducting the Seismic Reflection Pilot Study
- Preparing a Geophysical SAP
- Preparing a Monitoring Well SAP
- Preparing an Asymptotic Protocol
- Monitoring the soil vapor extraction system.

Work planned for the next reporting period in association with the Mall Order includes:

- Finalizing the monitoring well SAP and Asymptotic Protocol
- Installing wells in accordance with the Monitoring Well SAP
- Monitoring the soil vapor extraction system.

1.0 INTRODUCTION

This progress report has been prepared by Harding Lawson Associates (HLA) for Van Waters & Rogers Inc. (VW&R). It presents data collected and summarizes activities performed in association with ongoing investigations in Boise, Idaho, from March 29 through June 25, 1993.

This report has been prepared to meet the requirements of the Consent Orders dated October 9, 1992 (Boise Mall and Preliminary Study Area [PSA] Orders), between VW&R and the Idaho Department of Health and Welfare, Division of Environmental Quality (Department). The scope of work for this report was originally outlined in *Exhibit 3, Work Plan, Boise Towne Square Mall Supplemental Investigation and Final Remediation, Boise, Idaho (HLA, 1992a).* This report presents a summary of activities conducted during the reporting period and activities to be conducted during the next reporting period associated with the Water Supply Order dated January 3, 1992, and PSA and Boise Mall Orders.

2.0 WATER SUPPLY ORDER

2.1 Work Conducted During the Reporting Period

Activities conducted under the Water Supply Order during the reporting period included:

- Submitting the Affected Area Water Hookup letter
- Resubmitting letters to homeowners who have not responded to VW&R's offer to connect residences to Boise Water Corporation (BWC) water system
- Continuing to connect households to the BWC water system
- Conducting quarterly sampling of wells containing perchloroethylene (Perc) above the analytical detection limit but below the EPA's maximum contaminant level (MCL) of 5 μg/l.

2.1.1 Affected Area Water Hookup letter

An Affected Area Water Hookup letter describing VW&R's hookup activities was submitted to the Department on April 26, 1993 (*HLA, 1993c*). This letter described activities associated with connecting properties having Type A and Type B wells in and near the Affected Area to a public water supply (i.e., BWC water mains). Type A wells are those readily connectable to a BWC water main. Type B wells are those not readily connectable to a water main.

As described in the Affected Area Water Hookup letter, of the 15 properties with Type A wells, 12 of the hookups have been completed. One property owner refused hookup. No response to letters sent by VW&R has been received from the owner of the other two wells. In addition to the properties originally proposed for hookup, two additional Type A wells were identified and hookups completed. Based on results of Supplemental Sampling conducted in February 1993 (*HLA, 1993b*) three additional properties with Type A wells were identified. Water Supply Connection Agreements and Well Closure Agreements were sent to these property owners in

April 1993. One response has been received. Appropriate steps are being initiated to connect this property to the BWC water system.

To expedite providing an alternative water supply to property owners with Type B wells, VW&R contracted BWC to install water mains along several roads in west Boise. Approval has been received from property owners and BWC has installed water meters at 47 Type B locations. Two private plumbing contractors have been retained by VW&R to connect households and businesses to BWC water meters.

VW&R will continue BWC connections and water main installations, as appropriate, as additional consent forms are received.

2.1.2 Quarterly Sampling

In accordance with requirements of the Water Supply Order, wells containing Perc concentrations above the analytical detection limit but below the MCL of 5 μg/l were sampled to verify and monitor the Perc concentration. Groundwater sampling was conducted from May 17 through May 19, 1993. Prior to sampling, authorization was obtained from well owners to collect samples from their wells. Sample collection activities were performed in accordance with the Quality Assurance Project Plan (QAPP) and are described in the following sections (*HLA, 1992b*). In addition to wells sampled as part of the regular quarterly program, authorization was obtained from two property owners whose properties are located outside the Affected Area as defined by HLA's letter dated March 24, 1993 (*HLA, 1993b*) but had not responded to VW&R's offer to connect to the BWC water system. Similar requests were made of three other property owners, however, authorization was not granted. The purpose of sampling these additional wells was to verify that the residences are outside the Affected Area.

The sampling method used to collect groundwater samples from the private wells was a function of well construction and access. In general, wells were purged with their installed pumps for a minimum of 5 minutes and until the pH, temperature, and conductivity readings stabilized. Following purging activities, groundwater samples were collected from the discharge line at the access point closest to each well. All samples were placed in sample containers appropriate for the required analysis. All samples were placed in a cooler that was chilled to a temperature of approximately at 4 degrees Celsius and sent under chain of custody via overnight courier to Analytical Technologies, Inc. (ATI), Renton, Washington.

Duplicate samples were collected from three wells and laboratory-prepared trip blanks were shipped in the coolers along with the well samples to the analytical laboratory.

All samples were analyzed by ATI for halogenated volatile organic compounds using EPA Test Method 8010. Specific analytical results obtained from private well samples are confidential. In general, Perc was detected in 13 of the 16 samples at concentrations ranging from 0.5 to 390 μg/l. Five samples contained Perc at concentrations greater than the EPA's MCL of 5 μg/l. Eight samples contained Perc at concentrations above the detection limit but below the MCL. Trichloroethene (TCE) was detected in two well samples at concentrations of 0.7 and 0.8 μg/l. Trichlorofluormethane, a common refrigerant, was detected in one well sample at a concentration of 0.6 μg/l. Methylene chloride was detected in one trip blank but not in any of the well samples.

Evaluation of quality assurance/quality control data indicated that the data are accurate and precise (Table 1). The data also met the method-specified holding times.

Overall completeness was 100 percent and exceeds the goals specified in the QAPP (*HLA, 1992b*).

The individual results of the sample analyses have been provided under separate cover to each of the respective well owners.

2.2 Work Planned for Next Reporting Period

Wells with concentrations of Perc above the analytical detection limit but below the MCL of 5 μg/l will be sampled on a quarterly basis. Sampling activities for the third quarter of 1993 are currently scheduled for August 17, 1993.

Connections to water mains will continue during the next reporting period until all connections are completed for properties whose owners have provided written authorization to VW&R. Additional certified letters will be sent to property owners whose property is located within the Affected Area but have not responded to VW&R's offer to connect them to the BWC water system. Following delivery of these letters, phone enquiries will also be made. Reimbursement for one year of BWC water utility costs continues for west Boise residents as requests are received by VW&R.

3.0 PRELIMINARY STUDY AREA ORDER

3.1 Work Conducted During the Reporting Period

A draft Soil Boring SAP was submitted to the Department on May 10, 1993 (*HLA, 1993e*). The Soil Boring SAP described the soil boring and well installation activities planned in the Affected Area. The purpose of the proposed soil boring activities is to gather data to assist in the characterization of hydrogeologic conditions at the distal end of the Affected Area and to provide information about the vertical distribution of Perc. The scope of work includes: (1) drilling a pilot boring and collecting groundwater samples to evaluate the vertical distribution of Perc at the northwest (downgradient) end of the Affected Area, (2) completing the boring as a monitoring/extraction well, (3) using the data from the pilot boring to assist in installation of two additional monitoring/extraction wells (one at the edge of the Affected Area and one "guard well" between the Affected Area and the Bali Hai well to the northwest which will be used for monitoring purposes only), (4) collecting groundwater samples from the wells, and (5) evaluating the data.

In a letter dated June 2, 1993, the Department requested clarification of one item and requested that the "guard well" be constructed to correspond to the first screened interval of the Bali Hai well at a depth of approximately 347 feet.

VW&R responded to the Department's requests in a letter dated June 14, 1993. Review of the Well log for the Bali Hai well indicated that a clay lager extends from approximately 135 to 210 feet below ground surface. Rather than installing a deep monitoring well, VW&R proposed to collect water-level measurements from the "guard" well to evaluate the effect pumping of the Bali Hai well has on the shallow aquifer and to monitor deep domestic wells in the area.

3.2 Work Planned for the Next Reporting Period

The soil boring program will commence during the summer of 1993. The schedule is dependent on subcontractor availability and access negotiations. Following completion of the soil boring program, a geophysical SAP is scheduled to be submitted to the Department.

4.0 BOISE MALL ORDER

4.1 Work Conducted During the Reporting Period

The following activities were conducted during the reporting period:

- Completion of the Pilot Boring Program
- Completion of the geophysical logging and seismic reflection pilot study
- Preparation of a Geophysical SAP
- Preparation of a Monitoring Well SAP
- Preparation of an Asymptotic Protocol

4.1.1 Pilot Boring Program

The pilot boring program including the geophysical investigation was conducted between March 26 and April 23, 1993. Drilling, sample collection, equipment decontamination, and other field activities were conducted in accordance with the Pilot Boring SAP and the QAPP (*HLA, 1993a; HLA, 1992b*). The results of the pilot boring program were presented in a letter to VW&R, with copies to the Department, dated May 11, 1993 (*HLA, 1993f*). The results were further discussed in the Monitoring Well SAP (*HLA, 1993g*).

Two borings were drilled at the Mall as part of the pilot boring program. Boring MW-1 is located in the parking lot north of the Olive Garden restaurant and MW-2 is in the parking lot approximately 76 feet northeast of State Well MW-1. The borings were drilled using air casing hammer techniques to maximum depths of 158 feet. The borings were logged by an HLA geologist using soil cutting samples collected at five-foot intervals. The lithologic logs showed, in general, extensive sand and gravel in the upper 150 feet.

Chemical profiling was performed in the borings when possible. Grab groundwater samples were collected from the boring for Well MW-1 at depths of 58 and

78 feet. Grab groundwater samples were collected from the boring for Well MW-2 at depths of 58 and 98 feet. Following drilling, the borings were completed as groundwater monitoring wells. The total depths for MW-1 and MW-2 are 128 and 137 feet, respectively. It was not possible to complete the wells at the total depth of the boreholes due to heaving sands. Following well development, groundwater samples were collected from each well. All groundwater samples were analyzed for halogenated and aromatic volatile organic compounds using EPA Test Methods 8010 and 8020. The analytical results are presented in Table 2.

Perc was detected in the grab samples collected from depths of 58 and 78 feet from the boring for Well MW-1 at concentrations of 650 and 1 μg/l, respectively. Perc was not detected in the groundwater sample collected from the completed well. Grab samples collected from the boring for MW-2 indicate that perc was detected at a concentration of 2.1 μg/l in the 58-foot sample and was not detected in the 98-foot sample nor in the sample collected from the completed well. These analytical results indicate that perc is limited to approximately the upper 70 feet of the shallow aquifer beneath the Site.

The results of the geophysical seismic reflection pilot study and geophysical logging of the pilot boring were presented in the Geophysical SAP (described below; *HLA, 1993d*).

4.1.2 Geophysical SAP

The Geophysical SAP presented the results of the geophysical pilot study and logging, and contained recommendations for future geophysical work activities for the Mall. The objective of the geophysical pilot study was to gather data to evaluate the feasibility of using geophysical techniques to assist in the characterization of

hydrogeologic conditions at the Mall. To meet this objective, HLA conducted a seismic reflection pilot study and geophysically logged one boring, MW-1. Geophysical well logs for Boring MW-1 generally supported the geologic data obtained during the pilot boring program.

The seismic reflection pilot study indicated the presence of strong reflectors (indicative of a clay layer) at depths greater than 160 feet. The quality of the data indicated that use of this method is feasible for providing information on the geology in the vicinity of the mall. However, collection of additional geophysical data on the deep reflectors beneath the Mall to delineate their extent was considered unnecessary as these reflectors are much deeper than the extent of Perc in the shallow aquifer. Additional geophysical investigations were therefore not recommended. The Department concurred with this recommendation in their letter dated June 2, 1993 (*IDHW, 1993*).

4.1.3 Monitoring Well SAP

A draft Monitoring Well SAP was submitted to the Department on June 17, 1993, (*HLA, 1993*). The SAP described monitoring/extraction well installation activities planned at the Mall. The purpose of the planned investigation is to provide hydrogeologic data for the Site and to confirm that the vertical distribution of perc and perc compounds is limited to the upper 70 feet of the shallow aquifer. Three onsite wells are proposed along the axis of the groundwater plume. Initially, these wells will be used for monitoring purposes but will be constructed such that they can be converted to groundwater extraction points. Additionally, one upgradient, offsite monitoring well is proposed. No comments on the Monitoring Well SAP have yet been received from the Department.

4.1.4 Asymptotic Protocol

A draft Asymptotic Protocol was submitted to the Department on June 17, 1993 (*HLA, 1993h*). The Asymptotic Protocol describes the statistical approach proposed for identifying and calculating when an Asymptotic limit for regulated chemicals has been attained in groundwater during groundwater remediation at the Mall. Comments on the Asymptotic Protocol have not yet been received from the Department.

4.1.5 Soil Vapor Extraction System

The soil vapor extraction system continues to operate as designed, however, it was temporarily shut down on May 26, 1993 because the carbon disposal facility informed VW&R that it could not accept additional shipments of spent carbon. VW&R immediately initiated investigative activities to identify a facility capable of handling the spent carbon. Until approval is received from the disposal facility, the SVE system will remain inoperational. VW&R expects to resolve spent carbon disposal issues during late June 1993. To date, over 1,200 pounds of perc have been removed from the subsurface.

Air quality samples will be collected from the influent, effluent, and the three vapor monitoring wells when the SVE system is brought back online. Daily readings of the influent, effluent, mid-stream, and the three vapor monitoring wells continue to be made while the system is operating.

4.2 Work Planned for the Next Reporting Period

The Monitoring Well SAP and Asymptotic Protocol are scheduled to be finalized 14 days after receipt of comments from the Department. The monitoring/extraction wells will be installed during the summer of 1993; the exact schedule is dependent on subcontractor availability and access negotiations. The SVE system will be operated as

designed and as specified in the operating permit upon identification of a disposal facility for the spent carbon.

5.0 SCHEDULE

A schedule for the Mall and PSA Order activities is shown in Table 3. Activities to be conducted next quarter are highlighted.

6.0 REFERENCES

Harding Lawson Associates, 1992a. *Exhibit 3, Work Plan, Boise Towne Square Mall Supplemental Investigation and Final Remediation, Boise, Idaho.* September 8.

_____, 1992b. *Quality Assurance Project Plan, Boise Mall and Preliminary Study Area Work Plans, Boise, Idaho.* November 2.

_____, 1993a. *Supplemental Pilot Boring Sampling and Analysis Plan, Boise Towne Square Mall, Boise, Idaho.* February 9.

_____, 1993b. *Affected Area, Boise Idaho.* Letter to Ron Lane, Idaho Department of Health and Welfare Division of Environmental Quality. March 24.

_____, 1993c. *Affected Area Water Hookup Activities, Boise, Idaho.* Letter to Ron Lane, Idaho Department of Health and Welfare, Division of Environmental Quality. April 26.

_____, 1993d. *Geophysical Sampling and Analysis Plan, Boise Mall Order, Boise, Idaho.* May 6.

_____, 1993e. *Draft Soil Boring Sampling and Analysis Plan, Preliminary Study Area Order, Boise, Idaho.* May 10.

_____, 1993f. *Pilot Boring Program Summary, Boise Towne Square Mall, Boise, Idaho.* Letter to Wayne Grotheer, Van Waters & Rogers, Inc. May 11.

_____, 1993f. *Monitoring Well Sampling and Analysis Plan, Boise Towne Square Mall Order, Boise, Idaho.* June 16.

_____, 1993h. *Statistical Approach, Boise Mall Order, Boise, Idaho.* Letter to Ron Lane, Idaho Department of Health and Welfare Division of Environmental Quality. June 17.

Idaho Department of Health and Welfare Division of Environmental Quality, 1993. Letter to Mike Gaudette, Van Water & Rogers Inc. June 2.

TABLES

Table 1. Quality Assurance Summary
Quarterly Progress Report, April-June 1993
Boise Towne Square Mall
Boise, Idaho

Quality Control Sample	Acceptance Criterion[1]	Number of Analyses	Number of Analyses Within Acceptance Criterion	Percent of Analyses Within Acceptance
FIELD				
Field blank	No compounds detected	--	--	--
Trip blank	No compounds detected	58	57	98%
Field duplicate	≤ 100% RPD	4	4	100%
LABORATORY				
Method Blank	No compounds detected	116	116	100%
Matrix Spike	60 - 150%	24	24	100%
Matrix Spike duplicate	60 - 150%	12	12	100%
Surrogate Spike recovery	70 - 130%	8	8	100%
Surrogate Spike recovery duplicate	70 - 130%	4	4	100%

Overall Completeness: $\frac{221}{222} \times 100 = 100\%$

1 Acceptance criterion specified in the QAPP (HLA, 1992b)

Table 2. Pilot Boring Analytical Results Summary
Quarterly Progress Report, April-June 1993
Boise Towne Square Mall
Boise, Idaho

Sample Number	Sample Date	Location	Depth Collected (ft)	Sample Type	Perc Concentration (ug/l)	Other Detected Analytes (ug/l)	Comments
93033101	3/31/93	MW-1-boring	58	Grab	650	ND	
93033102	3/31/93	Equip. Blank	NA	QC	0.3	Toluene - 0.7 1,1,1 TCA - 2.8	Not detected in samples
93033103	3/31/93	Trip Blank	NA	QC	<0.2	Toluene - 0.5	Not detected in samples
93033104	3/31/93	MW-1-boring	78	Grab	1	ND	
93041501	4/15/93	MW-2-boring	58	Grab	2.1	ND	
93041502	4/15/93	MW-2-boring	98	Grab	<0.2	ND	
93041601	4/16/01	Trip Blank	NA	QC	<0.2	Toluene - 1.0	Not detected in samples
93042101	4/21/93	MW-1-well	128	Well	<0.2	ND	
93042102	4/21/93	MW-1-well (dup)	128	Well/QC	<0.2	ND	
93042103	4/21/93	Trip Blank	NA	QC	<0.2	Toluene - 1.0	Not detected in samples
93042104	4/21/93	Equip. Blank	NA	QC	<0.2	ND	
93042201	4/22/93	MW-2-well	137	Well	<0.2	ND	

Note: Toluene detected in trip blanks is a suspected laboratory contaminant.
ug/l = micrograms per liter.
ND = Not Detected.
NA = Not Applicable.
QC = Quality control sample.

			COMMENTS
Act. No.	Order	Deliverable/Field Pro	Comments
1	BMO	Interim Control Measu	
2	BMO	Consent Order Signed	
3	PSA	Consent Order Signed	
4	BMO	Soil Gas Field Work	
5	PSA	Data Review	
6	PSA	Groundwater and Surf Water SAP	Final approval 01/12/93
7	PSA	Soil Gas SAP	Soil Gas Not Needed
8	PSA	IRM Work Plan	
9	BMO	Soil and Pilot Boring SAP	Final approval 01/25/93
10	BMO	Risk Assessment Work Plan	Final approval 03/18/93
11	BMO/ PSA	Quarterly Progress Reports	
12	BMO	Field Work for Pilot Borings	Dependent on subcontractor availability
13	PSA	Field Work for GW/SW SAP	Dependent on DEQ/ Other Parties
14	BMO	Geophysical SAP	Final approval 6/4/93
15	PSA	Soil Boring SAP	Extension req. 05/11/93
16	BMO	Field Work for Geophysical SAP	Geophysical investigation not proposed
17	PSA	Field Work for Soil Borings	After RAP approval, depend. on subcontractor
18	BMO	Monitoring Well SAP	2 weeks after receipt of
19	BMO	Aquagettic Protocol	approval
20	PSA	Geophysical SAP	2 wks after soil borings
21	BMO	Field Work for Monitoring Well Sam	21 weeks after RAP approval
22	PSA	Field Work for Geophysical Sampling	
23	BMO	Site Investigation Rep	2 months after MW
24	BMO	Risk Assessment Rep	installation/sampling
25	PSA	Phase I Investigation Report	2 months after geophys investigation complete
26	PSA	Phase II Work Plan	
27	BMO	Quarterly Monitoring	
28	BMO	Remedial Action Plan	
29	PSA	Field Work, Phase II	
30	PSA	Risk Assessment	
31	BMO	Public Comment Peri including RAP revisi	
32	PSA	Phase II Report and Risk Assessment	
33	BMO	Remedial Action Impl tation and Monitoring	
34	PSA	Remedial Action Plan	
35	PSA	Public Comment Peri and RAP Revisions	
36	BMO	Implement Remedial	

Task Complete

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